

# 6 Cables

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## 6.1 DC Power Cables

### Overview

DC power cables include -48 V power cables and RTN ground cables. You need to cut the delivered DC power cables into appropriate lengths according to actual situations in your site and make DC power cables onsite. Choose appropriate DC power cables for different scenarios according to the following rules:

- If a switch is connected to a power distribution box or frame, use DC power cables with a JG2 90° right angle terminal at one end and an OT terminal at the other end.
- If a switch is directly connected to a power distribution cabinet, use DC power cables with a JG2 90° right angle terminal at one end and determine the terminal type at the other end and the cable length based on the site survey result.

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**NOTICE**

Do not bend OT terminals to 90 degrees onsite.

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DC power cables with the following cross-sectional areas are available: 25 mm<sup>2</sup> and 35 mm<sup>2</sup>. They apply to scenarios that require different power supply distances, as listed in [Table 6-1](#).

**Table 6-1** DC power cable usage scenarios

Cable Type	Maximum Power Supply Distance
25 mm <sup>2</sup>	23 m
35 mm <sup>2</sup>	32 m

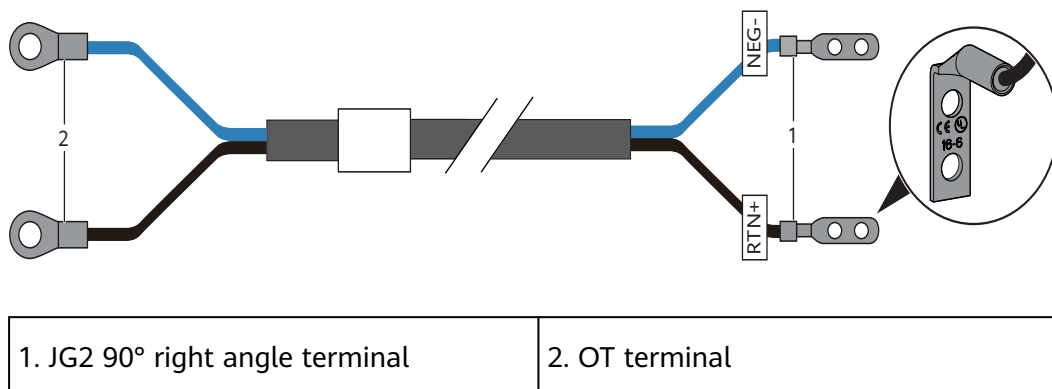
## Appearance and Structure

### NOTE

The figures provided here are for reference only and may differ from the actually delivered cables.

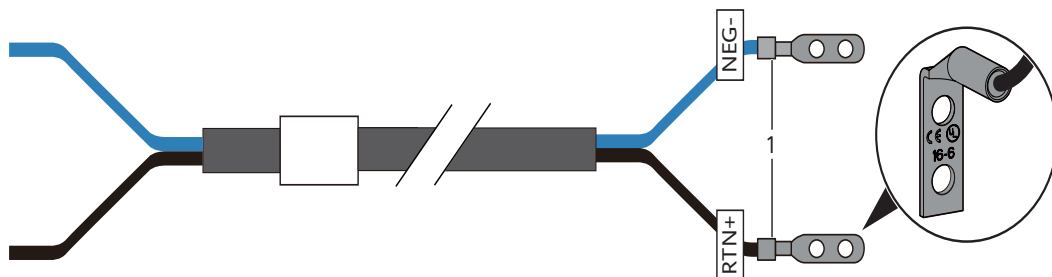
[Figure 6-1](#) shows a DC power cable used for connection with a power distribution box or frame.

**Figure 6-1** Appearance of a DC power cable



[Figure 6-2](#) shows a DC power cable used for connection with a power distribution cabinet.

**Figure 6-2** Appearance of a DC power cable



1. JG2 90° right angle terminal

## Connection

A DC power cable transmits DC power to a chassis. Terminals are crimped onsite. A DC power cable is connected in the following way:

- Connection with a power distribution box or frame: The JG2 90° right angle terminal is connected to a terminal block on a DC PEM at the rear of the switch chassis, and the OT terminal is connected to the power distribution box or frame.
- Connection with a power distribution cabinet: The JG2 90° right angle terminal is connected to a terminal block on a DC PEM at the rear of the switch chassis, and the other end is connected to the power distribution cabinet.

## 6.2 AC&240 V/380 V High-Voltage DC Power Cables

### NOTE

The AC&240 V/380 V high-voltage DC chassis requires Huawei-customized high-voltage DC connectors. Only AC&240 V/380 V high-voltage DC cables delivered by Huawei can be used.

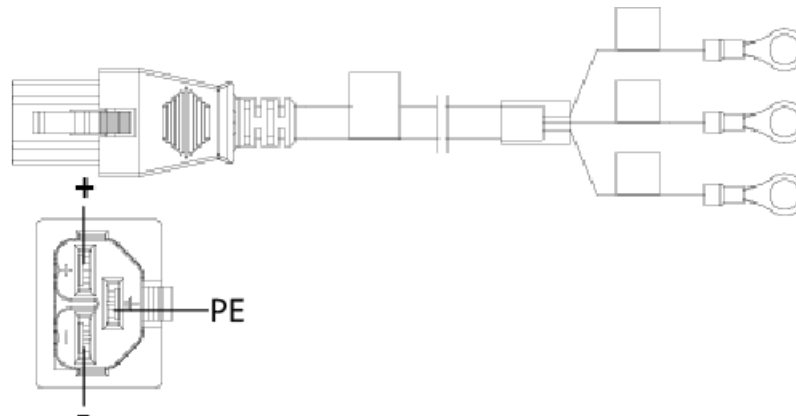
### Direct Connection to a PDF

AC&240 V/380 V high-voltage DC power cables share the same part number: 04153056 (HVDC 3 straight female – OT M8, 25 m). [Figure 6-3](#) and [Figure 6-4](#) show the appearance and structure of such power cables, respectively.

**Figure 6-3** Appearance of an AC&240 V/380 V high-voltage DC power cable (HVDC 3 straight female – OT M8)



**Figure 6-4** Structure of an AC&240 V/380 V high-voltage DC power cable (connector on the device side – connector on the PDF side)



The mappings between terminals and core wires are as follows: (PE) – yellow and green; (+) – brown; (-) – blue.

## Cable Connections for Direct Connection to a PDF

An AC&240 V/380 V high-voltage DC power cable is connected in the following way:

- HVDC 3 straight female connector: is connected to a socket on a PEM at the rear of the chassis.
- OT M8: is connected to a PDF. The brown wire is connected to the L terminal, the blue wire is connected to the N terminal, and the yellow/green wire is connected to the ground terminal. The AC power cables to be delivered may vary according to local regulations or customer requirements.

Select AC&240 V high-voltage DC power cables based on the types of power sockets used in your equipment room. Huawei provides power distribution unit (PDU) power cables and country-specific power cables to suit different types of power sockets.

## Connection to a PDU

- C19 PDU power cables: HVDC straight female to C20 straight male AC power cables, delivered with a PDU with C19 straight female sockets. [Figure 6-5](#) shows a PDU power cable.

Figure 6-5 PDU power cable and PDU



- Huawei horizontal PDU power cables: HVDC straight female to HVDC straight male power cables must be delivered for PDUs with HVDC ports.

Figure 6-6 Horizontal PDU power cable and PDU



- Country-specific power cables: delivered in compliance with standards of the destination country or region. For example, AC&240 V high-voltage DC power cables with PI angle male connectors are used in China. Figure 6-7 shows such a power cable.

Figure 6-7 Power cable and power strip used in China

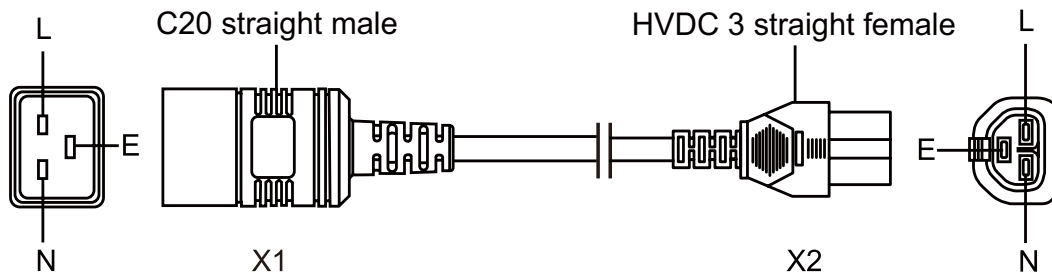


When 380 V high-voltage DC power is supplied, an appropriate Huawei horizontal HVDC PDU is required, and HVDC straight female to HVDC straight male power cables are delivered with the PDU.

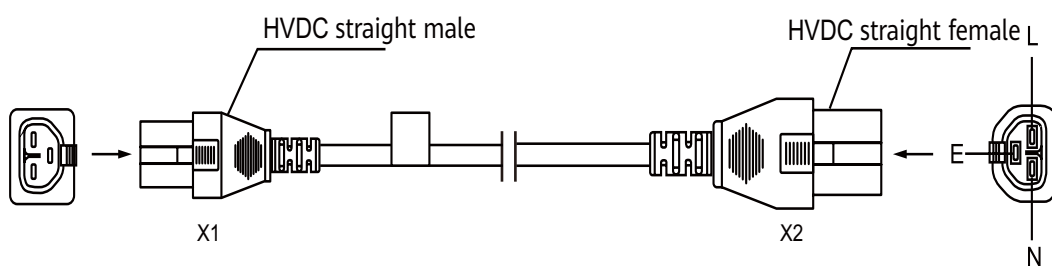
**NOTE**

L indicates the negative terminal, and N indicates the positive terminal.

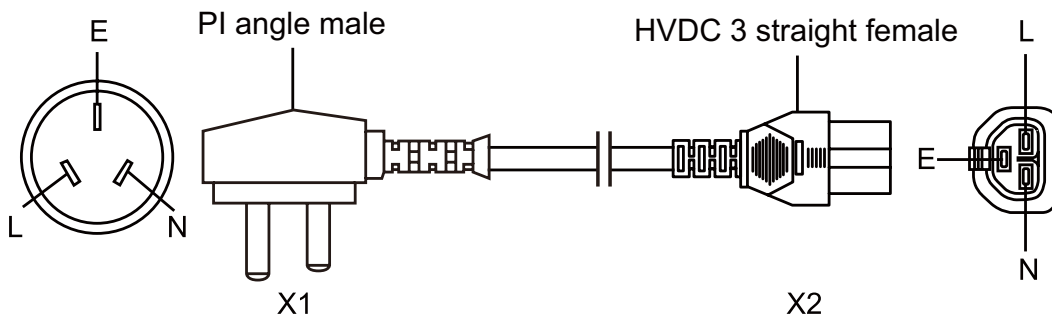
**Figure 6-8** Structure of a PDU power cable



**Figure 6-9** Structure of a horizontal PDU power cable



**Figure 6-10** Structure of a power cable used in China



## Cable Connections for Connection to a PDU

An AC&240 V/380 V high-voltage DC power cable transmits AC&240 V/380 V high-voltage DC power to a chassis and is connected in the following way:

- The HVDC 3 straight female connector is connected to a socket on a PEM at the rear of the chassis.
- The other plug is connected to a PDU or an external socket.

## Technical Specifications

- Technical specifications of a PDU power cable

**Table 6-2** describes technical specifications of a PDU power cable, and **Figure 6-6** shows its structure.

**Table 6-2** Technical specifications of a PDU power cable

Part Number	Country/Region	Description	Connector X1	Connector X2	Length
04151958	Global	Power Cable,2.5m, 3*1.5mm <sup>2</sup> ,HVDC 3SF, (H05VV-F-1.5mm <sup>2</sup> (3C)+14SJT(3C)),C20SM,PDU	C20 straight male	HVDC 3 straight female	2.5 m
04152989	China	Power Cable,3m, 3*1.5mm <sup>2</sup> ,Black,HVDC 3SM, 227IEC57-1.5 <sup>2</sup> (3C),HVD C 3SF,China 380V HVDC PDU Power Cable	HVDC 3 straight male	HVDC 3 straight female	3 m
04152990	United States	Power Cable,3m, 3*14AWG,Black,HVDC 3SM,14SJT3(3C),HVDC 3SF,American 380V HVDC PDU Power Cable	HVDC 3 straight male	HVDC 3 straight female	3 m
04152991	Japan	Power Cable,2.5m, 3*2.0mm <sup>2</sup> ,Black,C20SM, HVCTF-2.0mm <sup>2</sup> (3C),HV DC 3SF,Japan AC Power 250V15A	C20 straight male	HVDC 3 straight female	2.5 m
04153057	Europe	Power Cable,3m, 3*1.5mm <sup>2</sup> ,Black,HVDC 3SM,H05V2V2-F-1.5mm <sup>2</sup> (3C),HVDC 3SF,Europe 380V HVDC PDU Power Cable	HVDC 3 straight male	HVDC 3 straight female	3 m

- Technical specifications of a country-specific power cable  
Use power cables complying with local standards in different countries or regions. Select power cables according to [Table 6-3](#). [Figure 6-10](#) shows the structure of a power cable used in China.

**Table 6-3** Technical specifications of power cables applicable to different countries or regions

Part Number	Country/Region	Description	Connector X1	Connector X2	Length
04152719	United States	Power Cable,2.5m,HVDC 3SF, 12SJT(3C),NEMA5-20PAM, North America AC Power 125V20A	NEMA5-20P angle male	HVDC 3 straight female	2.5 m
04152721	Germany	Power Cable,2.5m,HVDC 3SF,H05VVF-1.5 <sup>2</sup> (3C),PFAM, Europe AC Power 250V16A	PF angle male	HVDC 3 straight female	2.5 m
04152722	Japan	Power Cable,2.5m,HVDC 3SF,HVCTF-3.5mm <sup>2</sup> (3C),NEMA5-20PAM, Japan AC Power Cable 125V20A	NEMA5-20P angle male	HVDC 3 straight female	2.5 m
04152723	Australia/ New Zealand	Power Cable,2.5m,HVDC 3SF,H05VV-F 2.5mm <sup>2</sup> (3C),PISM, Australia AC Power 250V16A	PI straight male	HVDC 3 straight female	2.5 m
04152724	India	Power Cable,2.5m,HVDC 3SF,IS 694-1.5mm <sup>2</sup> (3C),PM-IIIAM, India AC Power 250V16A	PM-III angle male	HVDC 3 straight female	2.5 m
04152725	Switzerland	Power Cable,2.5m,HVDC 3SF,H05VV-F-1.5mm <sup>2</sup> (3C),PJ-II SM, Switzerland AC Power Cable 250V16A	PJ-II straight male	HVDC 3 straight female	2.5 m
04152726	South Africa	Power Cable,2.5m,HVDC 3SF,H05VV-F-1.5mm <sup>2</sup> (3C),PMAM, South Africa AC Power 250V16A	PM angle male	HVDC 3 straight female	2.5 m



Part Number	Country/Region	Description	Connector X1	Connector X2	Length
04152721	South Korea	Power Cable,2.5m,HVDC 3SF,H05VVF-1.5 <sup>2</sup> (3C),PFAM,Europe AC Power 250V16A	PF angle male	HVDC 3 straight female	2.5 m
04152731	Brazil	Power Cable,2.5m,HVDC 3SF,H05VVF-1.5 <sup>2</sup> (3C),PN-ISM,Brazil AC Power 250V16A	PN-I straight male	HVDC 3 straight female	2.5 m
04151963	China	Power Cable,2.5m, 3*1.5mm <sup>2</sup> ,HVDC 3SF, 227IEC53-1.5 <sup>2</sup> (3C),PIAM,For China	PI angle male	HVDC 3 straight female	2.5 m

## 6.3 Ground Cable

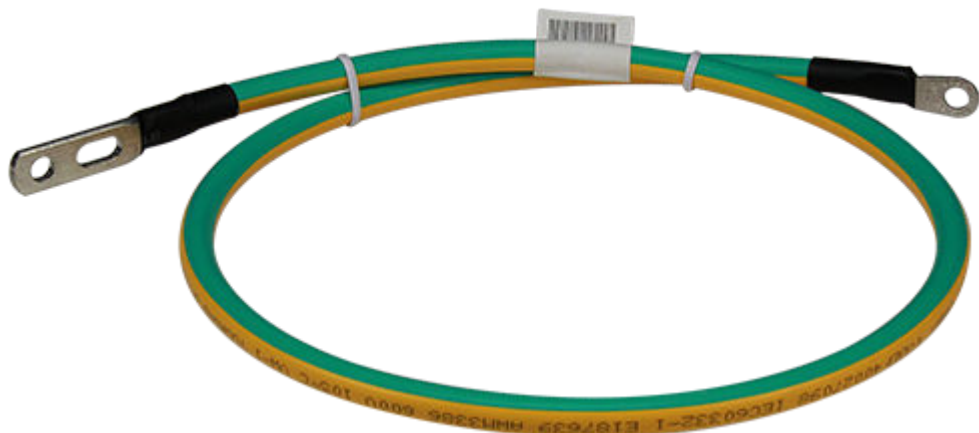
### Overview

The ground cable ensures equipotential between the chassis and cabinet. The ground point on the chassis is at the rear of the chassis on the right side, and is identified by a yellow grounding label.

### Appearance and Structure

**Figure 6-11** shows the appearance of the ground cable.

**Figure 6-11** Appearance of the ground cable



**Figure 6-12** shows the structure of the ground cable.

**Figure 6-12** Structure of the ground cable



## Connection

A ground cable grounds a device to protect it from lightning and electromagnetic interference. A ground cable is connected to a chassis in the following way:

- The OT bare crimp terminal X1 connects to the ground point on the chassis.
- The OT bare crimp terminal X2 connects to the ground bar of the cabinet.

## Technical Specifications

**Table 6-4** Technical specifications of the ground cable

Part Number	Description	X1	X2	Length
04152748	Power Cable, 0.85m,OT2-16-8,H07Z-K-16^2G&Y,O T16-6	14170120: OT2-16-8	14170020: OT16-6	0.85 m
04152748-001	Power Cable, 4m,OT2-16-8,H07Z-K-16^2G&Y,O T16-6	14170120: OT2-16-8	14170020: OT16-6	4 m

## 6.4 Console Cable

### Appearance and Structure

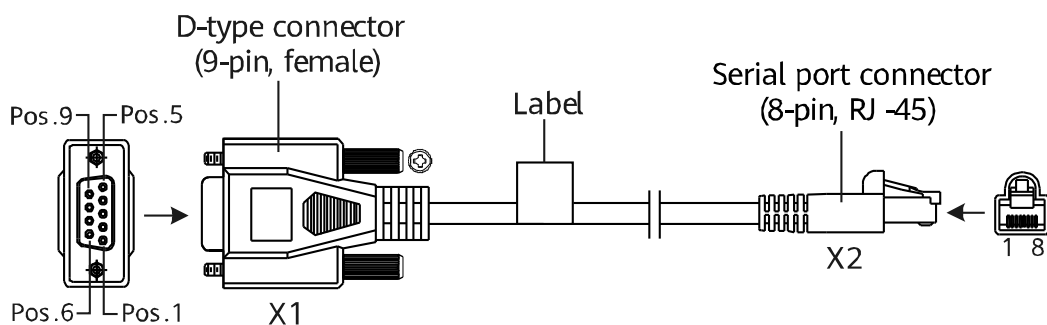
**Figure 6-13** shows the appearance of a console cable.

**Figure 6-13** Console cable appearance



**Figure 6-14** shows the structure of a console cable.

**Figure 6-14** Console cable structure



## Pin Assignments

**Table 6-5** lists the pin assignments of console cable connectors.

**Table 6-5** Pin assignments of console cable connectors

Connector	X1 (DB9)	X2 (RJ45)
Pin assignment	2	3

Connector	X1 (DB9)	X2 (RJ45)
	3	6
	5	5

## Connection

A console cable connects the console port of a switch to the serial port of a console, enabling users to commission or locally maintain the device. A shielded cable or an unshielded cable can be used according to the onsite situation.

A console cable connects a device and a console as follows:

- The 8-pin RJ45 connector is connected to the console port of the switch.
- The DB9 female connector is connected to a maintenance terminal, such as a computer.

## 6.5 Ethernet Cable

### Types of Ethernet Cables

Ethernet cables are classified into straight-through cables and crossover cables:

- Straight-through cable: [Table 6-6](#) lists the pin assignments of the RJ45 connectors on the two ends of a straight-through cable.
- Crossover cable: [Table 6-7](#) lists the pin assignments of the RJ45 connectors on the two ends of a crossover cable.

### Appearance and Structure

#### NOTE

- Straight-through cables and crossover cables are standard unshielded twisted pairs that use RJ45 connectors.
- A straight-through cable and a crossover cable have the same appearance.

[Figure 6-15](#) and [Figure 6-16](#) show the appearance of an Ethernet cable.

**Figure 6-15** Ethernet cable appearance (1)

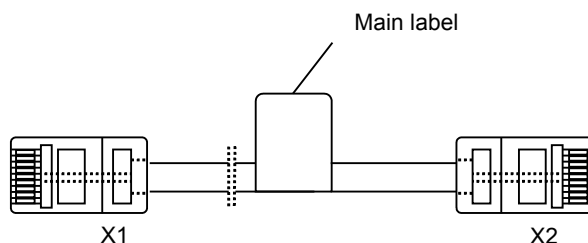


**Figure 6-16** Ethernet cable appearance (2)



**Figure 6-17** shows the structure of an Ethernet cable.

**Figure 6-17** Ethernet cable structure



## Pin Assignments

**Table 6-6** lists the pin assignments of a straight-through cable.

**Table 6-6** Pin assignments of a straight-through cable

X1 Pin	Wire Color	X2 Pin
1	White and orange	1
2	Orange	2
3	White and green	3
4	Blue	4
5	White and blue	5
6	Green	6
7	White and brown	7
8	Brown	8

**Table 6-7** lists the pin assignments of a crossover cable.

**Table 6-7** Pin assignments of a crossover cable

X1 Pin	Wire Color	X2 Pin
1	White and orange	3
2	Orange	6
3	White and green	1
4	Blue	4
5	White and blue	5
6	Green	2
7	White and brown	7

X1 Pin	Wire Color	X2 Pin
8	Brown	8

 **NOTE**

To achieve the best electrical transmission performance, ensure that the wires connected to pins 1 and 2 and to pins 3 and 6 are twisted pairs.

## Connection

Ethernet cables connect network devices to each other to enable the devices to communicate or to allow local maintenance and remote management.

- A straight-through cable connects a terminal (such as a PC or switch) to a network device.
- A crossover cable connects two terminals (such as PCs and switches).

## Supported Cabling Types for 10GBASE-T

**Table 6-8** describes the supported cabling types for a 10GBASE-T Ethernet electrical port.

**Table 6-8** Supported cabling types for 10GBASE-T

Item	Category 7 STP	Category 6A STP	Category 6A F/UTP	Category 6A U/UTP	Category 6 STP	Category 6 UTP
Cable Description	Category 7 shielded twisted pair (STP)	Category 6A shielded twisted pair	Category 6A foiled/unshielded twisted pair	Not supported	Not supported	Not supported
Type	Class F	Class Ea	Class Ea			
Maximum transmission distance	100 m	100 m	100 m			

Item	Category 7 STP	Category 6A STP	Category 6A F/UTP	Category 6A U/UTP	Category 6 STP	Category 6 UTP
Cabling system bandwidth	600 MHz <b>NOTE</b> The cabling system exceeds the requirements for IEEE 10GBASE-T performance.	500 MHz <b>NOTE</b> The cabling system exceeds the requirements for IEEE 10GBASE-T performance.				

 **NOTE**

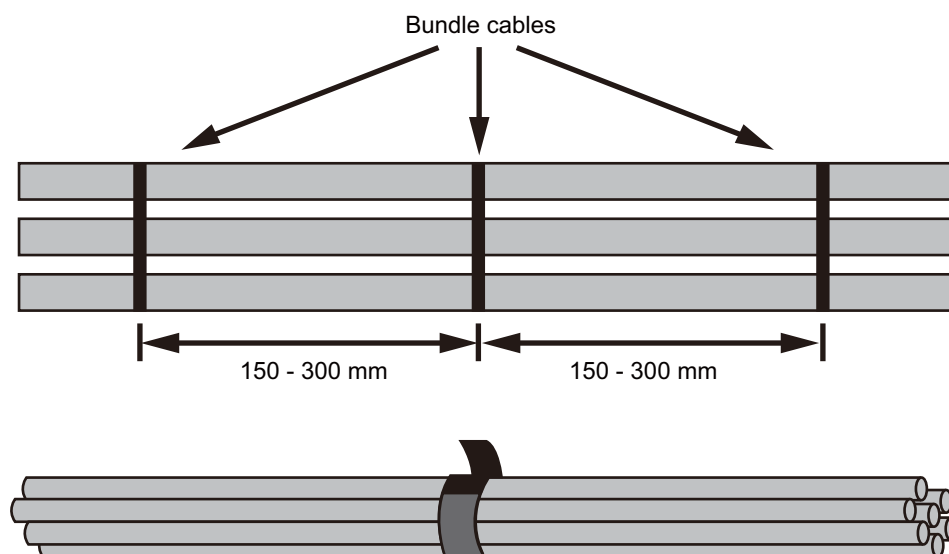
- In a new built equipment room, Category 6A shielded twisted pairs or Category 7 twisted pairs are recommended. These cables can avoid alien crosstalk while having no special installation requirements. In addition, they can be used with other types of cables.
- If Category 6A foiled/unshielded twisted pairs are used in an equipment room and the cabling systems can meet requirements of TSB-155, follow these rules route these cables:
  - Separate these cables with other types of cables. If they must be routed in the same cable trough with other types of cables, separated them from other cables using a metal plate.
  - Separate cables as much as possible at the outlet and keep the cables parallel with each other. Most alien crosstalk appears within 20 m away from the outlet. To reduce alien crosstalk, do not bundle cables in the first 5 m to 20 m.
  - If cables need to be bundled, bundle cables with cable ties placed every 150 mm to 300 mm. See [Table 6-9](#). Bundle cables loosely, as shown in [Figure 6-18](#).
  - You are advised to add no more than 12 cables in a bundle. A bundle cannot have more than 24 cables.

**Table 6-9** Intervals between cable ties

Diameter of an Ethernet Cable Bundle (mm)	Interval Between Cable Ties (mm)
< 10	150
10-30	200
> 30	300



**Figure 6-18** Method to bundle cables



## 6.6 Fiber Jumpers

### Overview

A fiber jumper consists of one or more optical fibers of a certain length and the optical connectors at both ends. A fiber jumper connects an optical module to a fiber terminal box.

Comply with the following rules when selecting fiber jumpers:

1. Determine the length of fiber jumpers based on the onsite cabling distance.
2. Determine the fiber type based on the optical module type.
  - Use a multimode fiber jumper for a multimode optical module.
  - Use a single-mode fiber jumper for a single-mode optical module.
3. Determine the optical connector type based on the port type.

Ensure that the optical connector at each end of a fiber jumper is the same type as the port to which it will be connected.

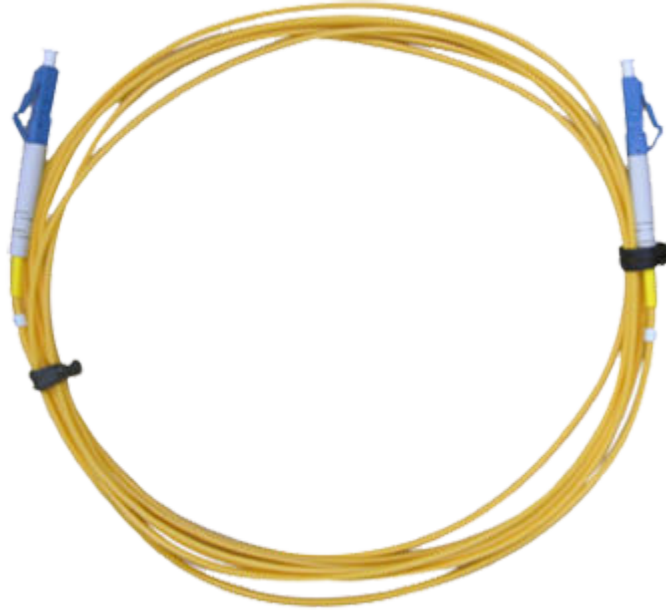
#### NOTE

The MPO-MPO fibers for CloudEngine series switches use type B connectors (key Up/key Up).

### Appearance and Structure

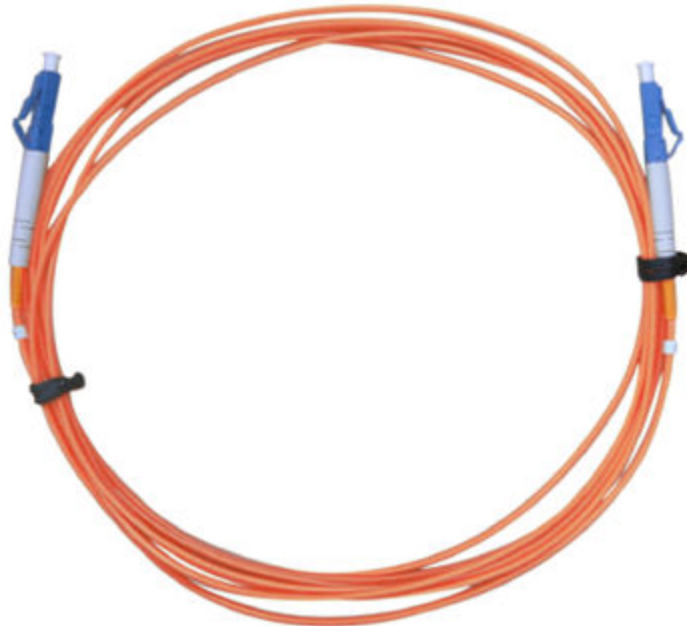
**Figure 6-19** shows the appearance of an LC single-mode fiber.

**Figure 6-19** Appearance of an LC single-mode fiber



**Figure 6-20** shows the appearance of an LC multimode fiber.

**Figure 6-20** Appearance of an LC multimode fiber



**Figure 6-21** shows the appearance of an MPO-MPO single-mode fiber.

**Figure 6-21** Appearance of an MPO-MPO single-mode fiber



**Figure 6-22** shows the appearance of an 8-core or 12-core MPO-MPO multi-mode fiber.

**Figure 6-22** Appearance of an 8-core or 12-core MPO-MPO multi-mode fiber



**Figure 6-23** shows the appearance of an MPO-4\*DLC fiber.

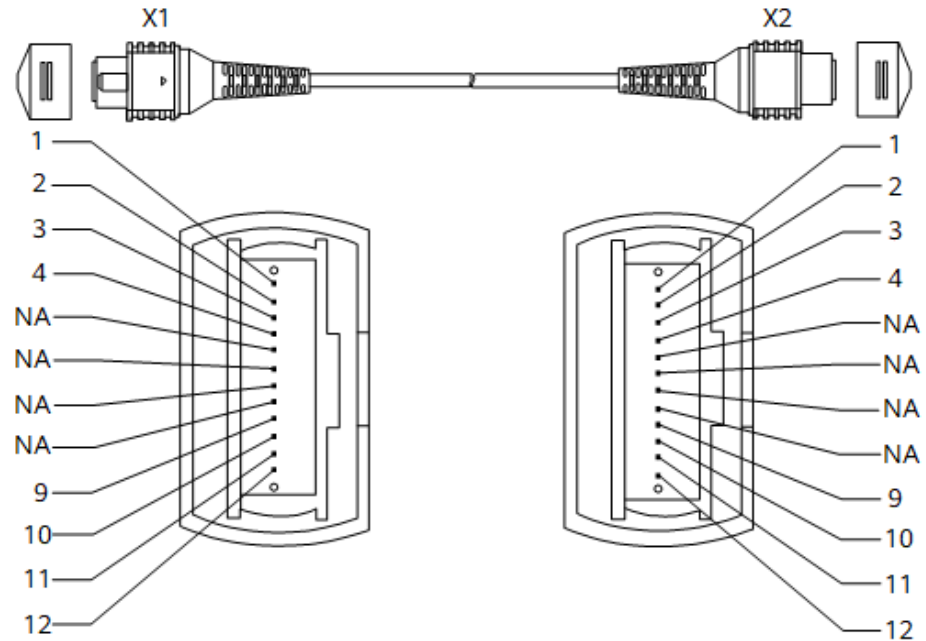
**Figure 6-23** Appearance of an MPO-4\*DLC fiber



## Pin Assignments

- Pin assignments of an 8-core MPO-MPO fiber

**Figure 6-24** Structure of an 8-core MPO-MPO fiber

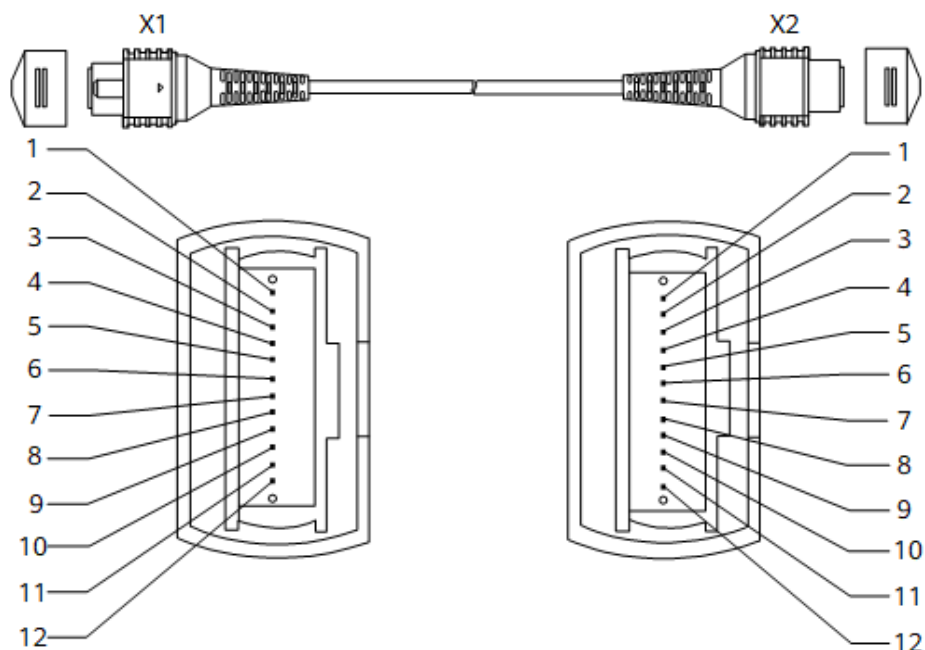


**Table 6-10** Pin assignments of an 8-core MPO-MPO fiber

X1 Pin	X2 Pin
1	12
2	11
3	10
4	9
9	4
10	3
11	2
12	1

- Pin assignments of a 12-core MPO-MPO fiber

**Figure 6-25** Structure of a 12-core MPO-MPO fiber

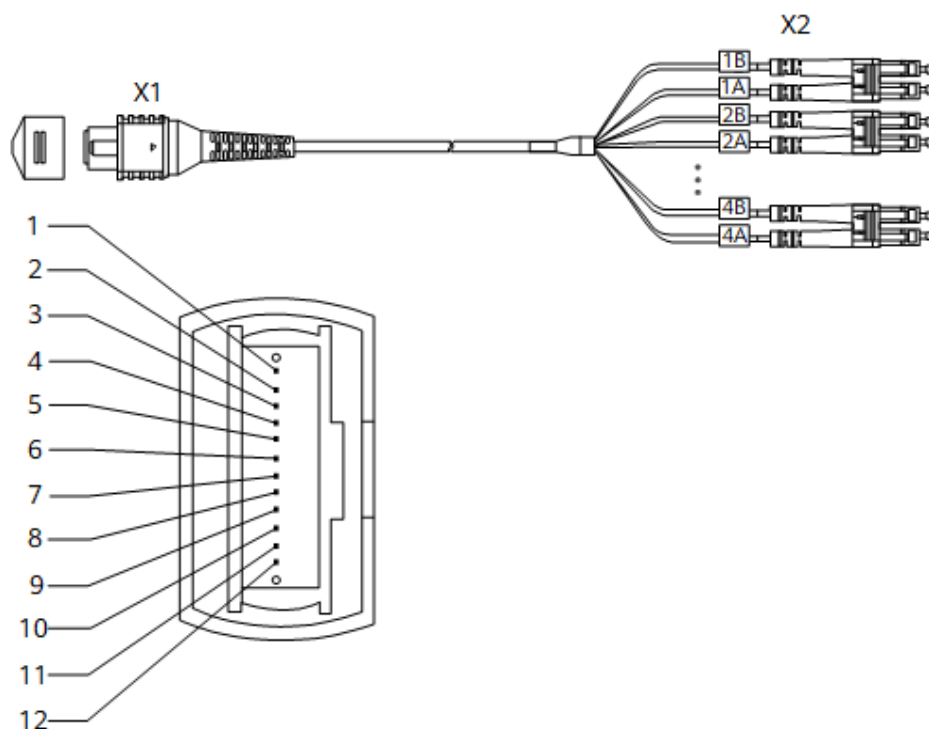


**Table 6-11** Pin assignments of a 12-core MPO-MPO fiber

X1 Pin	X2 Pin
1	12
2	11
3	10
4	9
5	8
6	7
7	6
8	5
9	4
10	3
11	2
12	1

- Pin assignments of an MPO-4\*DLC fiber

**Figure 6-26** Structure of an MPO-4\*4LC fiber



**Table 6-12** Pin assignments of an MPO-4\*4LC fiber

X1 Pin	X2 Pin
1	1B
2	2B
3	3B
4	4B
9	4A
10	3A
11	2A
12	1A

## Optical Fiber, Optical Connector, and Optical Distribution Frame

### Optical Fiber

Optical fibers are classified into single-mode fibers and multimode fibers.

- Single-mode fibers have a diameter of 5  $\mu\text{m}$  to 10  $\mu\text{m}$  and transmit laser in a single mode with a specified wavelength. These fibers support a wide frequency band and a large transmission capacity, so they are used for long-

distance transmission. Most single-mode fibers are yellow, as shown in [Figure 6-19](#).

- Multimode fibers have a diameter of 50  $\mu\text{m}$  or 62.5  $\mu\text{m}$  and transmit laser in multiple modes with a specified wavelength. These fibers have a lower transmission capacity than single-mode fibers and are used for short-distance transmission. Modal dispersion occurs during transmission over multimode fibers.

In the latest cabling infrastructure of ISO/IEC 11801, multimode fibers are classified into four categories: OM1, OM2, OM3, and OM4.

- OM1: traditional 62.5  $\mu\text{m}$ /125  $\mu\text{m}$  multimode fibers. OM1 fibers have a large core diameter and numerical aperture, and provide high light gathering ability and bending resistance.
- OM2: traditional 50  $\mu\text{m}$ /125  $\mu\text{m}$  multimode fibers. OM2 fibers have a small core diameter and numerical aperture. Compared with OM1 fibers, OM2 fibers provide higher bandwidth because they significantly reduce the modal dispersion. When transmitting data at 1 Gbit/s with 850 nm wavelength, OM1 and OM2 fibers support maximum link lengths of 220 m and 550 m, respectively. OM1 and OM2 fibers can provide sufficient bandwidth within a distance of 300 m. Generally, OM1 and OM2 fibers are orange, as shown in [Figure 6-20](#).
- OM3: next-generation multimode fibers, with longer transmission distances than OM1 and OM2 fibers.
- OM4: laser optimized multimode fibers with 50  $\mu\text{m}$  core diameter. OM4 is an improvement to OM3 and only increases the modal bandwidth. OM4 fibers provide 4700 MHz\*km of modal bandwidth, whereas OM3 fibers provide only 2000 MHz\*km of modal bandwidth. Generally, OM3 and OM4 fibers are light green, as shown in [Figure 6-22](#). You can identify OM3 and OM4 fibers by their labels or printed marks.

MPO fibers are used for 40GE and 100GE optical modules. An MPO fiber consists of multiple multimode fiber cores, and each multimode fiber core provides one laser transmission channel. MPO fibers may come in the following specifications: 8-core, 12-core, or 24-core.

- A 40GE optical module uses four channels to transmit laser and four channels to receive laser. That is, a total of eight channels are required for a 40GE optical module. 8-core and 12-core MPO fibers have the same definition of fiber channels. Therefore, they are equivalent in functionality when connecting to 40GE optical modules.
- When 100GE optical modules are used, choose MPO fibers according to the optical module form factor. Choose 8-core or 12-core fibers for QSFP28 optical modules with MPO connectors.

An optical module installed with optical fibers with LC connectors uses one channel to transmit laser and one channel to receive laser. That is, two channels are required for such an optical module. A single-fiber bidirectional optical module uses one channel to transmit and receive laser, and therefore only one channel is required.

### Optical Connector

Optical connectors are used to connect optical fibers of the same type. [Table 6-13](#) lists common optical connectors.

**Table 6-13** Common optical connectors







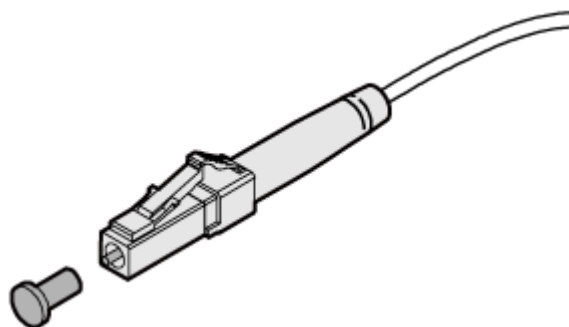
Connector Type	Optical Connector			
Square connector	SC/PC connector 	LC/PC connector 	MTRJ/PC connector 	MPO connector 
Round connector	FC/PC connector 	ST/PC connector 	-	-

Figure 6-27 shows an LC/PC optical connector.

**Figure 6-27** LC/PC optical connector



**NOTICE**

When connecting or removing an LC/PC optical connector, align the connector with the optical port and do not rotate the fiber. Pay attention to the following points:

- To connect a fiber, align the optical connector with the optical port and gently insert the optical fiber into the port.
- To remove a fiber, press the clip on the connector, push the connector inward slightly, and pull the fiber out.

**Optical Distribution Frame**

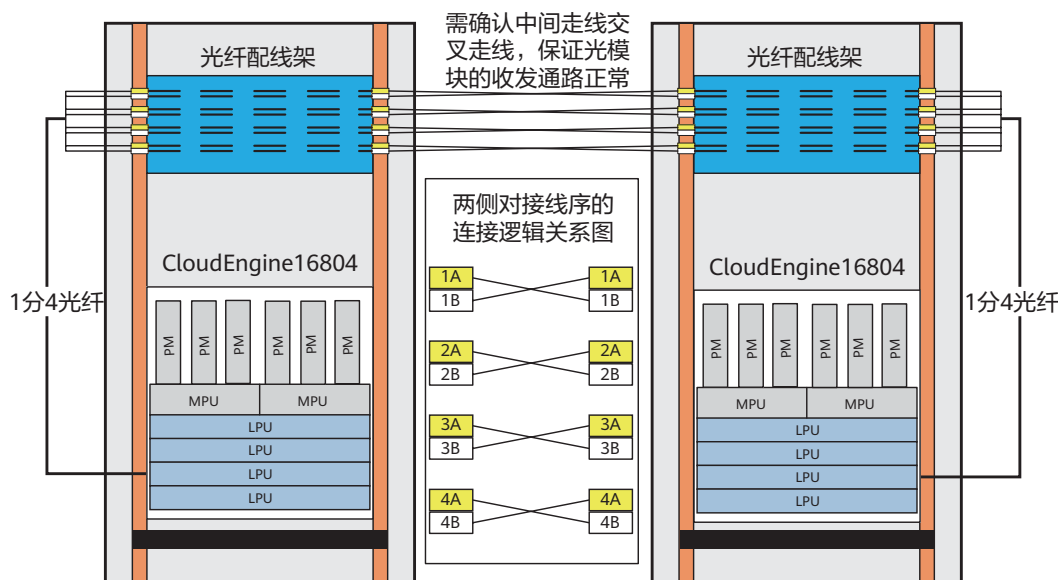
Optical ports of two switches are not directly connected by optical fibers. An optical distribution frame (ODF) is usually deployed between the two switches.

Figure 6-28 shows an example of MPO-4\*DLC (1-to-4) fiber connection through an ODF. When connecting optical fibers between two devices, pay attention to the following points:



- Determine the fiber connector type (LC/FC) supported by the ODF and select appropriate fiber jumpers for the supported connector type.
- Fiber jumpers from the DC switches at both ends must be connected to the ODF at the same sequence.
- Each pair of Tx and Rx optical fibers must be cross-connected on the ODF to ensure normal transmission between the optical modules at both ends.

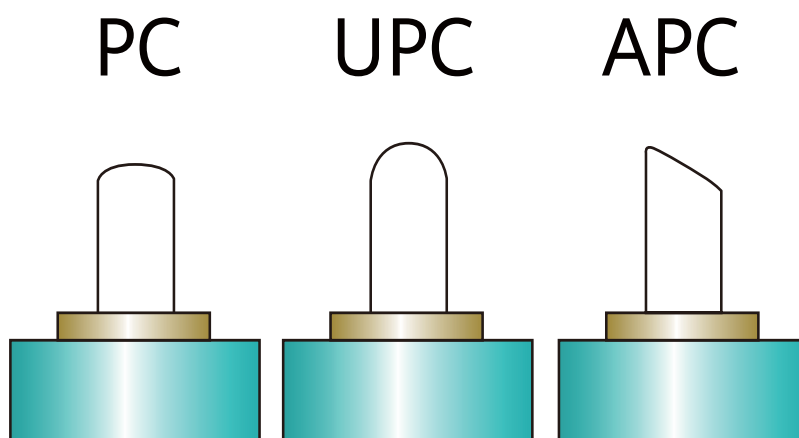
**Figure 6-28** MPO-4\*4DLC (1-to-4) fiber connection through an ODF



## Ceramic Ferrule End Face

Based on the return loss, the end faces of the fiber's ceramic ferrule are classified into three types: PC, UPC, and APC, as shown in [Figure 6-29](#).

**Figure 6-29** Polishing types of the fiber's ceramic ferrule end face



**Table 6-14** Polishing types of the fiber's ceramic ferrule end face

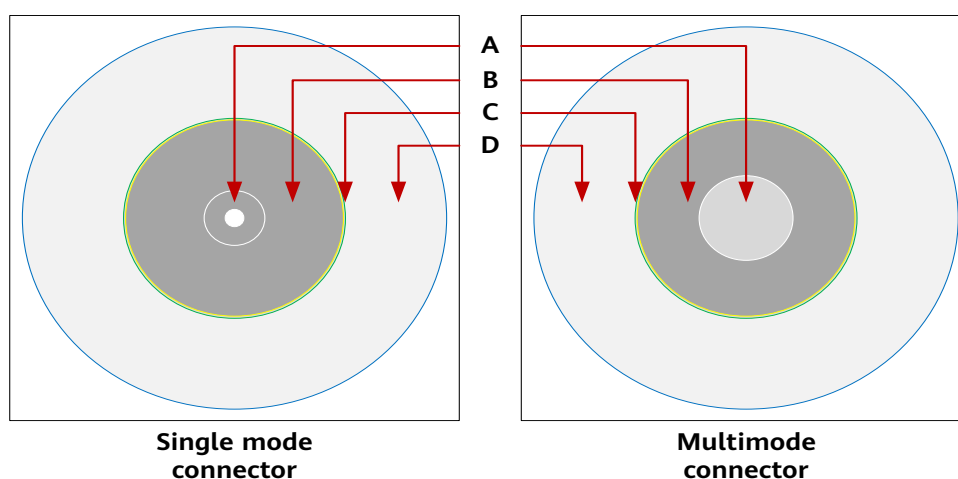
Polishing Type	Return Loss	Characteristics	Application Scenario
PC	-35 dB	Polished with a slight curvature	Scenarios with no high requirements on return loss
UPC	-50 dB	Dome-shaped	Scenarios with high requirements on return loss
APC	-60 dB	Polished with an 8-degree angle	

**NOTICE**

In principle, optical fibers with different ceramic ferrule end faces cannot be directly connected through optical connectors. Interconnection between PC and UPC connectors does not cause permanent physical damage to them. The structure of APC end faces is totally different from that of PC end faces. Therefore, if fibers with APC end faces and fibers with PC end faces are connected through optical connectors, their ceramic ferrule end faces will be damaged. To connect them together, use a fiber jumper. This, however, adversely affects the transmission performance.

**Figure 6-30** shows the requirements of different types of ceramic ferrule end face of fibers.

**Figure 6-30** Fiber's ceramic ferrule end faces



**Table 6-15** End face requirements for fiber ceramic ferrules

Type	Zone	Diameter	Defects	Scratches
Single mode connector	A. Core	0-25 $\mu\text{m}$	None	None
	B. Cladding	25-120 $\mu\text{m}$	< 2 $\mu\text{m}$ : no limit 2-5 $\mu\text{m}$ : 5 > 5 $\mu\text{m}$ : 0	$\leq$ 3 $\mu\text{m}$ : no limit > 3 $\mu\text{m}$ : 0
	C. Adhesive	120-130 $\mu\text{m}$	No limit	No limit
	D. Contact	130-250 $\mu\text{m}$	$\geq$ 10 $\mu\text{m}$ : 0	No limit
Multi mode connector	A. Core	0-65 $\mu\text{m}$	$\leq$ 5 $\mu\text{m}$ : 4 > 5 $\mu\text{m}$ : 0	$\leq$ 5 $\mu\text{m}$ : no limit > 5 $\mu\text{m}$ : 0
	B. Cladding	65-120 $\mu\text{m}$	< 2 $\mu\text{m}$ : no limit 2-5 $\mu\text{m}$ : 5 > 5 $\mu\text{m}$ : 0	$\leq$ 5 $\mu\text{m}$ : no limit > 5 $\mu\text{m}$ : 0
	C. Adhesive	120-130 $\mu\text{m}$	No limit	No limit
	D. Contact	130-250 $\mu\text{m}$	$\geq$ 10 $\mu\text{m}$ : 0	No limit

## 6.7 High-Speed Cable

### 6.7.1 Understanding High-Speed Cable

 NOTE

You are advised to use high-speed cables that are certified for Huawei data center switches. This is because high-speed cables that are not certified for Huawei data center switches cannot ensure transmission reliability and may affect service stability. Huawei is not liable for any problems caused by high-speed cables that are not certified for Huawei data center switches and will not fix such problems.

#### Appearance and Structure

**Figure 6-31** shows the appearance of an SFP+ to SFP+ high-speed cable.

**Figure 6-31** Appearance of an SFP+ to SFP+ high-speed cable



**Figure 6-32** shows the appearance of a QSFP+ to QSFP+ or QSFP28 to QSFP28 high-speed cable.

**Figure 6-32** Appearance of a QSFP+ to QSFP+ or QSFP28 to QSFP28 high-speed cable



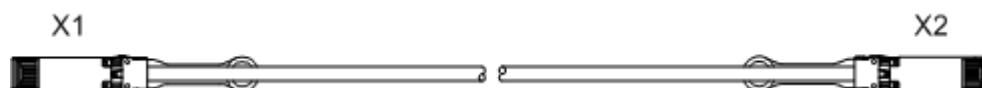
**Figure 6-33** shows the appearance of a QSFP+ to 4\*SFP+ or QSFP28 to 4\*SFP28 high-speed cable.

**Figure 6-33** Appearance of a QSFP+ to 4\*SFP+ or QSFP28 to 4\*SFP28 high-speed cable



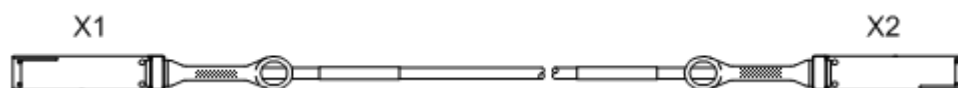
**Figure 6-34** shows the structure of an SFP+ to SFP+ high-speed cable.

**Figure 6-34** Structure of an SFP+ to SFP+ high-speed cable



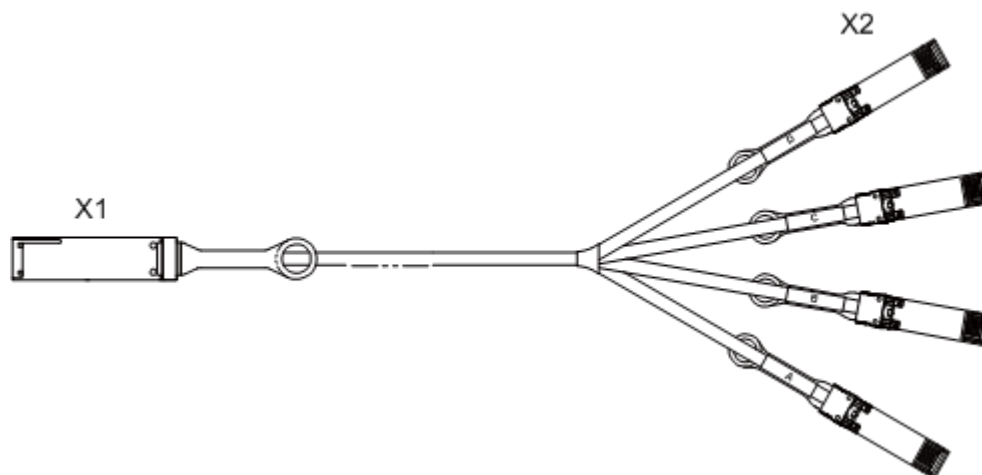
**Figure 6-35** shows the structure of a QSFP+ to QSFP+ or QSFP28 to QSFP28 high-speed cable.

**Figure 6-35** Structure of a QSFP+ to QSFP+ or QSFP28 to QSFP28 high-speed cable



**Figure 6-36** shows the structure of a QSFP+ to 4\*SFP+ or QSFP28 to 4\*SFP28 high-speed cable.

**Figure 6-36** Structure of a QSFP+ to 4\*SFP+ or QSFP28 to 4\*SFP28 high-speed cable



## 6.7.2 SFP+ to SFP+ High-Speed Cable

### 6.7.2.1 SFP-10G-CU1M

#### Technical Specifications

**Table 6-16** Technical specifications of the SFP-10G-CU1M

Item	Details
Part Number	02310MUN
Model	SFP-10G-CU1M
Description	SFP+,10G,High Speed Direct-attach Cables,1m,SFP +20M,CC2P0.254B(S),SFP+20M,Used indoor
Connector X1	SFP+
Connector X2	SFP+
Cable length [m (ft.)]	1 m (3.28 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	25 mm (0.98 in.)
Minimum Clearance for Cable Routing [mm (in.)]	60 mm (2.36 in.)

## 6.7.2.2 SFP-10G-CU3M

### Technical Specifications

**Table 6-17** Technical specifications of the SFP-10G-CU3M

Item	Details
Part Number	02310MUP
Model	SFP-10G-CU3M
Description	SFP+,10G,High Speed Direct-attach Cables,3m,SFP +20M,CC2P0.254B(S),SFP+20M,Used indoor
Connector X1	SFP+
Connector X2	SFP+
Cable length [m (ft.)]	3 m (9.84 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	25 mm (0.98 in.)
Minimum Clearance for Cable Routing [mm (in.)]	60 mm (2.36 in.)

## 6.7.2.3 SFP-10G-CU5M

### Technical Specifications

**Table 6-18** Technical specifications of the SFP-10G-CU5M

Item	Details
Part Number	02310QPR
Model	SFP-10G-CU5M
Description	SFP+,10G,High Speed Cable,5m,SFP +20M,CC2P0.254B(S),SFP +20M,LSFRZH For Indoor
Connector X1	SFP+
Connector X2	SFP+

Item	Details
Cable length [m (ft.)]	5 m (16.40 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	30 mm (1.18 in.)
Minimum Clearance for Cable Routing [mm (in.)]	60 mm (2.36 in.)

## 6.7.2.4 SFP-10G-AC10M

### Technical Specifications

**Table 6-19** Technical specifications of the SFP-10G-AC10M

Item	Details
Part Number	02310MUQ
Model	SFP-10G-AC10M
Description	SFP+,10G,Active High Speed Cables, 10m,SFP+20M,CC2P0.32B(S),SFP +20M,Used indoor
Connector X1	SFP+
Connector X2	SFP+
Cable length [m (ft.)]	10 m (32.81 ft.)
Electrical attribute	Active
Bend radius [mm (in.)]	25 mm (0.98 in.)
Minimum Clearance for Cable Routing [mm (in.)]	60 mm (2.36 in.)

## 6.7.3 QSFP+ to QSFP+ High-Speed Cable

### 6.7.3.1 QSFP-40G-CU1M

## Technical Specifications

**Table 6-20** Technical specifications of the QSFP-40G-CU1M

Item	Details
Part Number	02310MUG
Model	QSFP-40G-CU1M
Description	QSFP+,40G,High Speed Direct-attach Cables,1m,QSFP +38M,CC8P0.254B(S),QSFP+38M,Used indoor
Connector X1	QSFP+
Connector X2	QSFP+
Cable length [m (ft.)]	1 m (3.28 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	35 mm (1.38 in.)
Minimum Clearance for Cable Routing [mm (in.)]	75 mm (2.95 in.)

### 6.7.3.2 QSFP-40G-CU3M

## Technical Specifications

**Table 6-21** Technical specifications of the QSFP-40G-CU3M

Item	Details
Part Number	02310MUH
Model	QSFP-40G-CU3M
Description	QSFP+,40G,High Speed Direct-attach Cables,3m,QSFP +38M,CC8P0.32B(S),QSFP+38M,Used indoor
Connector X1	QSFP+
Connector X2	QSFP+
Cable length [m (ft.)]	3 m (9.84 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	40 mm (1.57 in.)



Item	Details
Minimum Clearance for Cable Routing [mm (in.)]	75 mm (2.95 in.)

### 6.7.3.3 QSFP-40G-CU5M

#### Technical Specifications

**Table 6-22** Technical specifications of the QSFP-40G-CU5M

Item	Details
Part Number	02310MUJ
Model	QSFP-40G-CU5M
Description	QSFP+,40G,High Speed Direct-attach Cables,5m,QSFP+38M,CC8P0.40B(S),QSFP+38M,Used indoor
Connector X1	QSFP+
Connector X2	QSFP+
Cable length [m (ft.)]	5 m (16.40 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	45 mm (1.77 in.)
Minimum Clearance for Cable Routing [mm (in.)]	75 mm (2.95 in.)

### 6.7.4 QSFP+ to 4\*SFP+ High-Speed Cable

#### 6.7.4.1 QSFP-4SFP10G-CU1M

#### Technical Specifications

**Table 6-23** Technical specifications of the QSFP-4SFP10G-CU1M

Item	Details
Part Number	02310MUK

Item	Details
Model	QSFP-4SFP10G-CU1M
Description	QSFP+,4SFP+10G,High Speed Direct-attach Cables,1m,QSFP+38M,CC8P0.254B(S),4*SFP+20M,Used indoor
Connector X1	QSFP+
Connector X2	4*SFP+
Cable length [m (ft.)]	1 m (3.28 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	25 mm (0.98 in.)
Minimum Clearance for Cable Routing [mm (in.)]	QSFP+ end: 100 mm (3.94 in.) SFP+ end: 60 mm (2.36 in.)

#### 6.7.4.2 QSFP-4SFP10G-CU3M

### Technical Specifications

**Table 6-24** Technical specifications of the QSFP-4SFP10G-CU3M

Item	Details
Part Number	02310MUL
Model	QSFP-4SFP10G-CU3M
Description	QSFP+,4SFP+10G,High Speed Direct-attach Cables,3m,QSFP+38M,CC8P0.32B(S),4*SFP+20M,Used indoor
Connector X1	QSFP+
Connector X2	4*SFP+
Cable length [m (ft.)]	3 m (9.84 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	25 mm (0.98 in.)
Minimum Clearance for Cable Routing [mm (in.)]	QSFP+ end: 100 mm (3.94 in.) SFP+ end: 60 mm (2.36 in.)

### 6.7.4.3 QSFP-4SFP10G-CU5M

#### Technical Specifications

**Table 6-25** Technical specifications of the QSFP-4SFP10G-CU5M

Item	Details
Part Number	02310MUM
Model	QSFP-4SFP10G-CU5M
Description	QSFP+,4SFP+10G,High Speed Direct-attach Cables,5m,QSFP+38M,CC8P0.4B(S),4*SFP+20M,Used indoor
Connector X1	QSFP+
Connector X2	4*SFP+
Cable length [m (ft.)]	5 m (16.40 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	30 mm (1.18 in.)
Minimum Clearance for Cable Routing [mm (in.)]	QSFP+ end: 100 mm (3.94 in.) SFP+ end: 60 mm (2.36 in.)

### 6.7.5 QSFP28 to QSFP28 High-Speed Cable

#### 6.7.5.1 QSFP28-100G-CU1M

#### Technical Specifications

**Table 6-26** Technical specifications of the QSFP28-100G-CU1M

Item	Details
Part Number	02311KNW
Model	QSFP28-100G-CU1M
Description	QSFP28,100G,High Speed Direct-attach Cables,1m,(QSFP28),CC8P0.254B(S),QSFP28,Used indoor

Item	Details
Connector X1	QSFP28
Connector X2	QSFP28
Cable length [m (ft.)]	1 m (3.28 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	70 mm (2.76 in.)
Minimum Clearance for Cable Routing [mm (in.)]	90 mm (3.54 in.)

### 6.7.5.2 QSFP28-100G-CU3M

#### Technical Specifications

**Table 6-27** Technical specifications of the QSFP28-100G-CU3M

Item	Details
Part Number	02311KNX
Model	QSFP28-100G-CU3M
Description	QSFP28,100G,High Speed Direct-attach Cables,3m,(QSFP28),CC8P0.254B(S),QSFP28,Used indoor
Connector X1	QSFP28
Connector X2	QSFP28
Cable length [m (ft.)]	3 m (9.84 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	70 mm (2.76 in.)
Minimum Clearance for Cable Routing [mm (in.)]	90 mm (3.54 in.)

### 6.7.5.3 QSFP28-100G-CU5M

## Technical Specifications

**Table 6-28** Technical specifications of the QSFP28-100G-CU5M

Item	Details
Part Number	02311KNY
Model	QSFP28-100G-CU5M
Description	QSFP28,100G,High Speed Direct-attach Cables,5m,(QSFP28),CC8P0.4B(S),QSFP28,Used indoor
Connector X1	QSFP28
Connector X2	QSFP28
Cable length [m (ft.)]	5 m (16.40 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	70 mm (2.76 in.)
Minimum Clearance for Cable Routing [mm (in.)]	90 mm (3.54 in.)

## 6.7.6 QSFP28 to 4\*SFP28 High-Speed Cable

### 6.7.6.1 QSFP-4SFP25G-CU1M

## Technical Specifications

**Table 6-29** Technical specifications of the QSFP-4SFP25G-CU1M

Item	Details
Part Number	02311MNX
Model	QSFP-4SFP25G-CU1M
Description	100GE QSFP28-4SFP25G,High Speed Direct-attach Cables,1m,(QSFP28),(4*(CC2P0.254B(S))),(4SFP28)
Connector X1	QSFP28
Connector X2	4*SFP28
Cable length [m (ft.)]	1 m (3.28 ft.)

Item	Details
Electrical attribute	Passive
Bend radius [mm (in.)]	35 mm (1.38 in.)
Minimum Clearance for Cable Routing [mm (in.)]	QSFP28 end: 100 mm (3.94 in.) SFP28 end: 70 mm (2.76 in.)

### 6.7.6.2 QSFP-4SFP25G-CU3M

#### Technical Specifications

**Table 6-30** Technical specifications of the QSFP-4SFP25G-CU3M

Item	Details
Part Number	02311MNY
Model	QSFP-4SFP25G-CU3M
Description	100GE QSFP28-4SFP25G,High Speed Direct-attach Cables,3m,(QSFP28), (4*(CC2P0.254B(S))),(4SFP28)
Connector X1	QSFP28
Connector X2	4*SFP28
Cable length [m (ft.)]	3 m (9.84 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	35 mm (1.38 in.)
Minimum Clearance for Cable Routing [mm (in.)]	QSFP28 end: 100 mm (3.94 in.) SFP28 end: 70 mm (2.76 in.)

### 6.7.6.3 QSFP-4SFP25G-CU3M-N

#### Technical Specifications

**Table 6-31** Technical specifications of the QSFP-4SFP25G-CU3M-N

Item	Details
Part Number	02311MPA
Model	QSFP-4SFP25G-CU3M-N

Item	Details
Description	100GE QSFP28-4SFP25G,High Speed Direct-attach Cables,3m,(QSFP28), (4*(CC2P0.4B(S))),(4SFP28)
Connector X1	QSFP28
Connector X2	4*SFP28
Cable length [m (ft.)]	3 m (9.84 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	45 mm (1.77 in.)
Minimum Clearance for Cable Routing [mm (in.)]	QSFP28 end: 100 mm (3.94 in.) SFP28 end: 70 mm (2.76 in.)

#### 6.7.6.4 QSFP-4SFP25G-CU5M

### Technical Specifications

**Table 6-32** Technical specifications of the QSFP-4SFP25G-CU5M

Item	Details
Part Number	02311MPB
Model	QSFP-4SFP25G-CU5M
Description	100GE QSFP28-4SFP25G,High Speed Direct-attach Cables,5m,(QSFP28), (4*(CC2P0.4B(S))),(4SFP28)
Connector X1	QSFP28
Connector X2	4*SFP28
Cable length [m (ft.)]	5 m (16.40 ft.)
Electrical attribute	Passive
Bend radius [mm (in.)]	45 mm (1.77 in.)
Minimum Clearance for Cable Routing [mm (in.)]	QSFP28 end: 100 mm (3.94 in.) SFP28 end: 70 mm (2.76 in.)

## 6.8 AOC Cable

## 6.8.1 Understanding AOC Cables

### Overview

An active optical cable (AOC) is an active optical fiber with optical modules at both ends, and therefore is easy to use.

### Appearance and Structure

**Figure 6-37** Appearance of an SFP+ to SFP+ AOC cable



**Figure 6-38** Appearance of a QSFP+ to QSFP+ or QSFP28 to QSFP28 AOC cable



**Figure 6-39** Appearance of a QSFP+ to 4\*SFP+ AOC cable



## 6.8.2 SFP+ to SFP+ AOC Cable



### 6.8.2.1 SFP-10G-AOC-3M

#### Technical Specifications

**Table 6-33** Technical specifications of the SFP-10G-AOC-3M

Item	Details
Part Number	02311BKP
Model	SFP-10G-AOC-3M
Description	Optical transceiver,SFP+,1G~10.5G, (850nm,3m,AOC)
Connector X1	SFP+
Connector X2	SFP+
Cable length [m (ft.)]	3 m (9.84 ft.)
Operating Wavelength [nm]	850 nm
Operating Temperature [°C (°F)]	0 °C to 70 °C (32 °F to 158 °F)

### 6.8.2.2 SFP-10G-AOC10M

#### Technical Specifications

**Table 6-34** Technical specifications of the SFP-10G-AOC10M

Item	Details
Part Number	02310QWH
Model	SFP-10G-AOC10M
Description	AOC Optical Transceiver,SFP+,850nm, 1G~10G,10m
Connector X1	SFP+
Connector X2	SFP+
Cable length [m (ft.)]	10 m (32.81 ft.)
Operating Wavelength [nm]	850 nm
Operating Temperature [°C (°F)]	0 °C to 70 °C (32 °F to 158 °F)

## 6.8.3 QSFP+ to QSFP+ AOC cable

### 6.8.3.1 QSFP-H40G-AOC10M

#### Technical Specifications

**Table 6-35** Technical specifications of the QSFP-H40G-AOC10M

Item	Details
Part Number	02310SSH
Model	QSFP-H40G-AOC10M
Description	Optical transceiver,QSFP+,40G,(850nm,10m,AOC)
Connector X1	QSFP+
Connector X2	QSFP+
Cable length [m (ft.)]	10 m (32.81 ft.)
Operating Wavelength [nm]	850 nm
Operating Temperature [°C (°F)]	0 °C to 70 °C (32 °F to 158 °F)

## 6.8.4 QSFP+ to 4\*SFP+ AOC cable

### 6.8.4.1 QSFP-4SFP10-AOC10M

#### Technical Specifications

**Table 6-36** Technical specifications of the QSFP-4SFP10-AOC10M

Item	Details
Part Number	02310SSJ
Model	QSFP-4SFP10-AOC10M
Description	Optical transceiver,QSFP+,40G,(850nm,10m,AOC)(Connect to four SFP+ Optical Transceiver)
Connector X1	QSFP+
Connector X2	4*SFP+

Item	Details
Cable length [m (ft.)]	10 m (32.81 ft.)
Operating Wavelength [nm]	850 nm
Operating Temperature [°C (°F)]	0 °C to 70 °C (32 °F to 158 °F)

## 6.8.5 QSFP28 to QSFP28 AOC Cable

### 6.8.5.1 QSFP-100G-AOC-10M

#### Technical Specifications

**Table 6-37** Technical specifications of the QSFP-100G-AOC-10M

Item	Details
Part Number	02311KNQ
Model	QSFP-100G-AOC-10M
Description	Active Optical Cable ,QSFP28,100G, (850nm,10m,AOC)
Connector X1	QSFP28
Connector X2	QSFP28
Cable length [m (ft.)]	10 m (32.81 ft.)
Operating Wavelength [nm]	850 nm
Operating Temperature [°C (°F)]	0 °C to 70 °C (32 °F to 158 °F)

### 6.8.5.2 QSFP-100G-AOC-30M

#### Technical Specifications

**Table 6-38** Technical specifications of the QSFP-100G-AOC-30M

Item	Details
Part Number	02311RAH
Model	QSFP-100G-AOC-30M

Item	Details
Description	Active Optical Cable ,QSFP28,100G, (850nm,30m,AOC)
Connector X1	QSFP28
Connector X2	QSFP28
Cable length [m (ft.)]	30 m (98.42 ft.)
Operating Wavelength [nm]	850 nm
Operating Temperature [°C (°F)]	0 °C to 70 °C (32 °F to 158 °F)